

A TAXONOMIC STUDY OF THE GENUS
CHAMAECHAENACTIS RYDBERG (COMPOSITAE)

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The genus *Chamaechaenactis* of the tribe Heleniae of the family Compositae contains a single species which grows in the semi-arid foothill regions of the Colorado Plateau in central and eastern Utah, western Colorado, southwestern Wyoming, and northeastern Arizona. This species was described by Eastwood (1891, p. 231) as *Chaenactis scaposa* and was transferred to the newly established genus *Chamaechaenactis* by Rydberg (1906, p. 155). *Chamaechaenactis* has been maintained by most authors since that time, with the exception of Aven Nelson (Coulter and Nelson, 1909, p. 559), who placed *Chaenactis scaposa* in the genus *Actinella* under the name *Actinella carnosa* (the name *Actinella scaposa* was preoccupied). No reason was given for this transfer.

As to the relationships of this entity, Eastwood (op. cit.) in the original description stated:

"It might perhaps represent a new genus, but it seems better to regard it as an aberrant species of *Chaenactis*."

Rydberg (op. cit.) in erecting the genus wrote:

"Miss Eastwood, the discoverer of the plant, referred it to *Chaenactis*, to which it is not closely related, resembling this genus only in the color of the corolla. The structure of the fruit and pappus would place it nearer *Bahia* and *Tetranuris*."

Later Rydberg (1914, p. 63) apparently saw other relationships, for in the North American Flora, he placed the genus *Chamaechaenactis* in the subtribe Chaenactidanae instead of in the subtribe Bahianae which contained *Bahia* or in the Tetranuranae which contained *Tetranuris*.

Stockwell (1940) in his study of the genus *Chaenactis* made no mention of *Chamaechaenactis* or its relationship to *Chaenactis*. He probably considered *Chamaechaenactis* a "good" genus since he annotated some herbarium sheets as *Chamaechaenactis scaposa* (Eastw.) Rydb.

In the present paper evidence is submitted to indicate that *Chamaechaenactis* has its closest relationship with the genus *Chaenactis*, but should be maintained as a separate genus. In addition a new variety is described based on a detailed study of specimens from a number of herbaria.

The close relationship of *Chamaechaenactis* with *Chaenactis* is at once obvious in the many similarities in total morphology. The flowers of *Chamaechaenactis* are almost duplicated in corolla shape, size, and color by those of many species of *Chaenactis*. The stamens, styles and stigmas of the two genera are much alike, but the latter structures have some significant differ-

ences which will be mentioned later. The general pubescence and appearance of the head and involucre bracts is very similar in the two genera, even to the scarios margins on the inner bracts.

In spite of the many morphological similarities between the two genera, there are conspicuous differences which form a clear break that can be used for generic separation. The most obvious difference is the scapose habit of *Chamaechaenactis* as contrasted to the leafy-stemmed habit of *Chaenactis*. The entire or slightly crenate leaves of *Chamaechaenactis* are quite different from the dissected, pinnate or lobed leaves of *Chaenactis*. An exception to this is *Chaenactis Cusickii* which is a leafy annual with entire leaves. The broad, flattened style branches with distinct stigmatic lines, angled, four-sided achenes, and pappus scales with strong midribs further distinguish *Chamaechaenactis* from *Chaenactis* which has terete style branches, indistinct stigmatic lines, nearly terete achenes, and pappus scales without midribs. Table 1 summarizes the differences between the two genera.

TABLE 1. SUMMARY OF DIFFERENCES BETWEEN CHAENACTIS AND CHAMAEECHAENACTIS

<i>Chaenactis</i>	<i>Chamaechaenactis</i>
1. Stem leafy.	1. Stem scapose.
2. Pappus scales without midribs.	2. Pappus scales with strong midribs.
3. Leaves mostly lobed, pinnate to highly dissected.	3. Leaves entire or nearly entire.
4. Style branches nearly terete, stigmatic lines indistinct.	4. Style branches broad, flat, stigmatic lines distinct.
5. Achenes nearly terete.	5. Achenes angled, four-sided.

Since clear morphological distinctions exist between the two groups, and since these groups have been treated as "good" genera by most workers after Rydberg, it seems best to consider *Chamaechaenactis* as a separate genus delimited from but closely related to *Chaenactis*.

In respect to the perennial habit, similar actinomorphic flowers, and large number (7-10) of pappus scales, *Chamaechaenactis* might be considered more primitive than most species of *Chaenactis* according to the concepts of Stockwell (1940, p. 94). The entire leaves of *Chamaechaenactis* offer further evidence that this genus branched from the main *Chaenactis* stock rather early.

Seeds of *Chamaechaenactis* were collected in an effort to obtain chromosomal evidence to supplement this morphological study, but they did not germinate. Work along this line is contemplated since many species of *Chaenactis* have been studied cytologically (Stockwell, 1940), and a comparison might prove useful for drawing generic lines and possibly in determining evolutionary relationships.

TAXONOMY

Below is presented a taxonomic treatment of the genus based on the information available. The specimens cited are from various herbaria which are referred to by the abbreviations listed in Index Herbariorum, Part 1 (Lanjouw and Stafleu, 1952). The authors wish to express appreciation to the curators of these herbaria for the loan of specimens for this study.

CHAMAECHAENACTIS Rydb. Bull. Torrey Club 33:155. 1906.

Caespitose perennial, the whole plant hirsute-canescens; stem 6-8 cm. high, branching underground from a woody root and forming several crowns; leaves all basal, simple, petiole equaling the blade or up to twice as long, blade coriaceous, 8-12 mm. long, oblong to orbicular with an acute to obtuse tip, base cuneate to cordate, margins revolute, entire to crenate, lower surface covered with appressed white hairs, upper surface impressed-punctate and hirsute to nearly glabrous; involucre bracts about 12, in two series, outer ones linear-oblong, obtuse and broad, densely pubescent externally, glabrous with prominent nerves within, inner ones longer and with scarious, colorless to reddish-tipped margins; corolla tubular, regular, flesh-colored, lobes equal; stamens included; style tips broad; achenes clavate, four-sided, and densely villous; pappus of 7-10 nearly equal hyaline scales one-half the length of the achenes and with prominent midribs and erose tips.

Type species: *Chaenactis scaposa*.

CHAMAECHAENACTIS SCAPOSA (Eastw.) Rydb. var. **SCAPOSA**.
Chaenactis scaposa Eastwood, Zoe 2:231. 1891. *Chamaechaenactis scaposa* Rydberg, Bull. Torrey Club 33:155. 1906. *Actinella carnosa* A. Nels. Coulter and Nelson, Man. Rocky Mts. 559. 1909.

Corolla 6.5-9.0 mm. long; pappus 5.0-7.1 mm. long; involucre bracts 13.0-17.0 mm. long; leaf bases mostly truncate to cordate, leaf margins entire to crenate with at least some of the leaves on a plant with crenations, upper leaf surface sparingly hirsute to nearly glabrous, the lower hirsute, petiole 1.2-4.0 cm. long.

Type. On the mesa across the Gunnison River, near Grand Junction, Mesa County, Colorado. May, 1891. *Eastwood* (CAS). Isotype examined (GH).

Distribution. The geographic range of this variety is mainly western Colorado where it occurs in Mesa, Delta, Montrose and San Miguel counties (see fig. 1). One collection was seen from Apache County, Arizona, and one from the La Sal Mountains of Utah. The variety grows in rather sterile, clay soils on foothills of the western slope of the Colorado Rockies between elevations of 5,000 and 7,000 feet.

Material examined. ARIZONA. Apache County: 15 miles north of Ganado, June 10, 1937, *Peebles 13468* (US). COLORADO. Delta County: Uncompahgre Plateau, west of Delta, June 6,

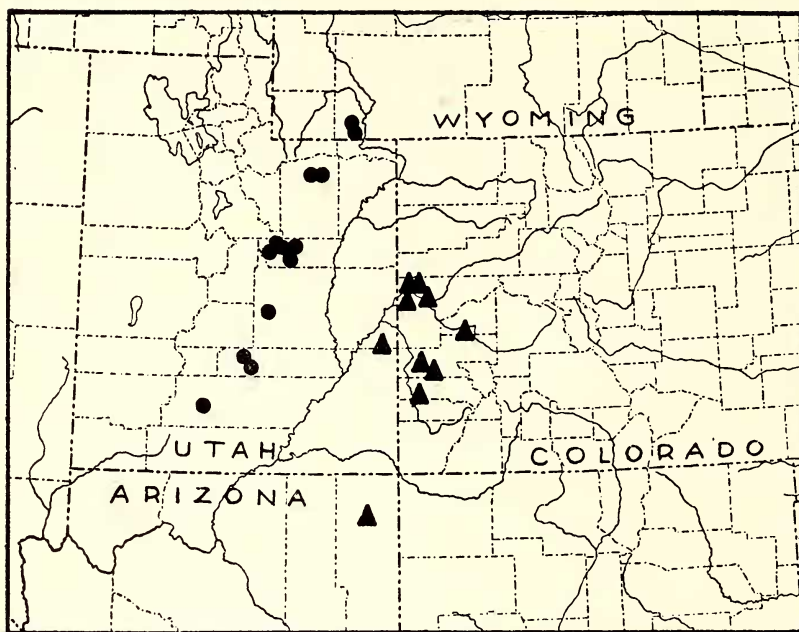


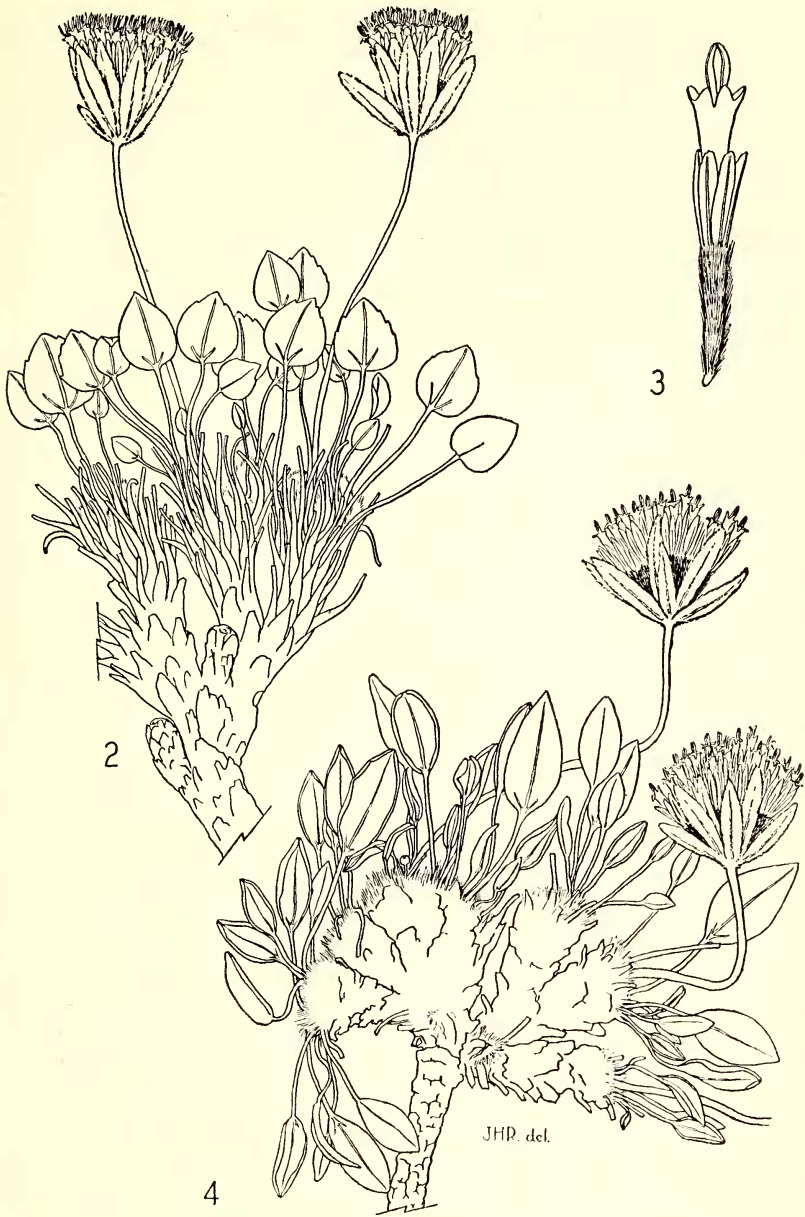
FIG. 1. Distribution of the varieties of *Chamaechaenactis scaposa*. Circles represent *C. scaposa parva*. Triangles represent *C. scaposa scaposa*.

1909, *Tidestrom 2166* (US). Mesa County: Grand Junction, *Eastwood*, May, 1891 (GH, isotype); Grand Junction, *Eastwood*, May, 1892 (GH, POM, UC); foothills, May to July, 1893, *Long* (GH); Gunnison Mesa, Grand Junction, May 15, 1916, *Eastwood 5096* (CAS); hills south of Grand Junction, June 11, 1920, *Osterhout 6016* (POM, RM). Montrose County: Naturita, April 30, 1914, *Payson 267* (GH, MO, RM, WS); Naturita, June 1, 1917, *Payson 988* (MO, RM). San Miguel County: Gypsum Valley, 4 miles UTAH. Grand or San Juan County: La Sal Mts., June 2 (4), 1914, *Jones* (POM, UC).

CHAMAECOAENACTIS SCAPOSA var. **parva** Preece & Turner var. nov.

Corolla 5.5-7.2 mm. long; pappus 4.2-6.3 mm. long; involucral bracts 11.0-13.0 mm. long; leaf bases mostly cuneate to truncate, leaf margins mostly entire, both upper and lower leaf surfaces sparingly to densely hirsute, petiole 1.0-1.8 cm. long.

Herbae perennes, corollis 5.5-7.2 mm. longis, pappo 4.2-6.3 mm. longo; involucri bracteis 11.0-13.0 mm. longis; foliis utrinque plus minusve dense hirsutis, basi plerumque cuneatis usque ad truncatis, marginibus plerumque integris, petiolis 1.0-1.8 cm. longis; aliter similis var. *scaposae*.



FIGS. 2-4. *Chamaechaenactis scaposa*. 2. Habit sketch of *C. scaposa scaposa*, natural size. Drawn from isotype, Eastwood (GH). 3. Same, Single floret, $\times 2$. 4. Habit sketch of *C. scaposa parva*, natural size. Drawn from type, Preece & Turner (WS).

Type. Rocky, silty, limestone soil, 32 miles south of Green River, Sweetwater County, Wyoming, July 3, 1951, Preece & Turner 2883 (WS).

Distribution. The geographic range of this variety is mainly in central Utah where it occurs in Carbon, Duchesne, Emery, Garfield, and Wayne counties (fig. 1). Wyoming collections are known only from Sweetwater County. Plants of this variety grow in sterile soils on the foothills east of the Wasatch Mountains of Utah and also the north and south sides of the Uinta Mountains generally between 5,000 and 7,000 feet elevation.

Material examined. UTAH. Carbon County: Price, June, 1898, Stokes (UC); near Price, June 11, 1900, Stokes (NY); Price, May 2 (12), 1927, Flowers 1330 (UT); Price, May, 1930, Flowers (UT); East Wellington, June 5, 1927, Cottam 2057 (BRY); 2 miles south of Price, May 9, 1940, Maguire & Maguire 18260 (GH, NY, UTC). Duchesne County: 3 miles west of Duchesne, May 30, 1942, Ripley & Barneby 4676 (CAS); 3 miles southwest of Duchesne, June 8, 1946, Ripley & Barneby 7808 (CAS). Emery County: Mounds, June 5, 1910, Jones (POM); San Rafael Swell, East Ferron, June 6, 1932, Cottam 5254 (UT). Garfield County: 5 miles north of Hatch, June 7, 1947, Ripley & Barneby 8534 (CAS). Wayne County: Grover, May 11, 1939, Harrison 9177 (BRY); between Grover and Teasdale, June 3, 1948, Holmgren & Nielsen 7760 (UTC, WS). WYOMING. Sweetwater County: 25 miles south of Green River, June 3, 1938, Rollins 2259 (GH, UC, US, UTC); 29 miles south of Green River, June 12, 1946, Ripley & Barneby 7879 (CAS); 32 miles south of Green River, July 3, 1951, Preece & Turner 2883 (GH, RM, isotypes; WS, type).

The two varieties of *C. scaposa* are compared in Table 2. Data for this comparison were obtained from a study of approximately thirty different collections which represent nearly all of the available material of this rare genus as represented in the major herbaria.

TABLE 2. COMPARISON OF THE VARIETIES OF CHAMAECHAENACTIS SCAPOSA.

	<i>C. scaposa scaposa</i>	<i>C. scaposa parva</i>
1. Involucral bract length.	13.0 - 17.0 mm.	11.0 - 13.0 mm.
2. Corolla length.	6.5 - 9.0 mm.	5.5 - 7.2 mm.
3. Pappus length.	5.0 - 7.1 mm.	4.2 - 6.3 mm.
4. Leaf base.	Mostly truncate to cordate.	Mostly cuneate to truncate.
5. Leaf margin.	Entire to crenate.	Mostly entire.
6. Upper leaf surface.	Sparingly hirsute to nearly glabrous.	Sparingly to densely hirsute.
7. Petiole length.	1.2 - 4.0 cm.	1.0 - 1.8 cm.

The morphological variation between the two varieties is mainly quantitative. *Chamaechaenactis scaposa scaposa* is consistently larger as to total plant size and as to size of individual

parts (table 2). Also, the pubescence of the upper leaf surface is quantitative with *C. scaposa parva* being consistently more hirsute than *C. scaposa scaposa*. On the other hand, *C. scaposa scaposa* plants have many more leaves with crenate margins than do those of *C. scaposa parva* which have mostly entire leaves. Since there is a positive correlation between the geographic distribution (fig. 1) and many morphological features, there seems to be good justification for proposing varietal rank for these closely related entities.

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NEW AND UNUSUAL FLESHY FUNGI FROM WYOMING

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We plan, in this series of papers on the fleshy fungi of Wyoming, to present data on new and rare fungi as they are encountered in the course of collecting throughout the State. Wyoming is an interesting state from the standpoint of fleshy fungi because of the many mountain ranges separated by semi-arid areas of great extent. Collecting these fungi, however, is often somewhat of a problem because of the varied pattern of precipitation and temperature from year to year. There are still many undescribed and many poorly known species in the Rocky Mountain area, and of course our main objective is to discover and describe these as rapidly as possible. A second important objective is to acquire data for plotting the distribution of both the rare and common species. In this respect it is interesting to note here the extension to the most easterly range of the Rockies of the ranges of a number of species described from the West Coast. Mycologists are just beginning to get sufficient data on many species to allow meaningful distributions for them to be established. Collections from Wyoming will yield valuable information on this subject. The